

## FOREST INSECT CONDITIONS ON THE BOISE N.F. - 1971

Following is a report of forest insect activity on the Boise National Forest in 1971. Information and data contained herein was compiled from ground evaluations, forest detection reports, aerial and ground detection surveys.

Douglas fir beetle which has been epidemic since 1966 leveled off in many areas and showed declines in areas of previous high activity. Widespread mountain pine beetle activity was observed in lodgepole and ponderosa pines; however, attack centers do not pose a major problem at present. Engreaver beetles, *Ips* spp. continued to show decreasing trends except in some logging areas where groups of small diameter, stagnated ponderosa pines have been killed. Western budworm continued to defoliate Douglas fir and true fir stands in the Idaho Primitive Area. New infestations of budworm were detected in Pistol Creek, east facing slopes of Snowbank Mountain, and around Big Eddy. The pine butterfly, which has been endemic since 1954, caused light defoliation of ponderosa pine in widely scattered areas. The western tussock moth defoliated large areas of *Ceanothus* sp. In many locations where this broad-leaved host was severely damaged, hungry larvae migrated to small ponderosa pines and caused moderate damage.

### DOUGLAS FIR BEETLE - Dendroctonus pseudotsugae Hopk.

Douglas fir beetle epidemics are not new to southern Idaho forests. Heavy losses occurred in the late fifties and early sixties. A resurgence of activity started after winter storms of 1964-1965 felled thousands of medium to large diameter trees which gave rise to rapid beetle buildups. Since that time heavy annual losses of Douglas fir have been experienced. Efforts to salvage log and shifting of sales to infested areas did little in the way of controlling the beetles as literally hundreds of infestation centers were left unharvested.

Unless windthrow and other storm debris is available for sustaining population buildups the Douglas fir beetle is usually incapable of sustaining standing tree attacks indefinitely. In addition, other natural factors such as predators, parasites, and adverse weather conditions, combine to hold populations in check.

Forest-wide a comparison of attack centers was made for the years 1970-1971. In 1970, 995 groups of 3-10 trees each and 499 groups of greater than 10 trees were detected. In 1971 these figures declined to 531 and 195 respectively. This represents a decrease of approximately 42 percent in the number of 3-10 trees per group and a 61 percent decline in groups of 10 or more trees.

It should be remembered that visual fading occurs approximately one year after the new attack so essentially we are talking about attacks that happened in 1969 and 1970. With the rather dramatic reduction in number of attack centers previously mentioned, it is reasonable to assume that Douglas fir beetle activity started a decided downward trend in 1970.

MOUNTAIN PINE BEETLE - *Dendroctonus ponderosae* Hopk.

Forest-wide the mountain pine beetle continues to cause losses in lodgepole and ponderosa pines. Increased activity was detected along the North Fork of the Boise River in the Graham area where approximately 500 lodgepole pines have been killed. For the past two years scattered tree killing has been observed in this area. However, the infestation has not taken on blow-up characteristics. This area did not receive a formal biological evaluation.

The Clear Creek infestation which started on non-Forest lands and crossed over the Forest boundary last year caused some group losses. Due to the intermix of conifer species and abundance of mixed pole stands, only scattered group killing of large diameter lodgepole pines is occurring.

For several years we have followed mountain pine beetle activity on private lands southeast of Cascade, Idaho. The infestation, occurring in second-growth ponderosa pines, borders forest land on the north. However, only minimum losses have been observed on the Cascade Ranger District.

This infestation has never received direct control action and therefore has provided an undisturbed area for following the course of the infestation. Beetle attacks have continued for seven consecutive years at what could be considered epidemic status. Basically, mortality has been confined to small diameter, stagnated pines which in effect has produced a non-selective thinning of the pines. This year data was taken in two areas by variable plot cruising north and south of Warner pond (Table I). From the table it can be seen that losses have been heaviest in the smaller diameter classes. It should be noted, however, that stocking of larger diameter trees per acre is inversely proportionate to the number of smaller trees.

It appears that sufficient smaller diameter pine will be available for continuing attacks of the beetle in spite of fairly heavy losses to date. Ponderosa stands north of Warner Pond have suffered a 38.9 percent loss primarily in the 10 inch and smaller diameter classes. This area is mixed with lodgepole pine. South of the pond, ponderosa pine mortality has soared to 64.2 percent with major losses once again in the small d.b.h. classes.

This infestation has been expanding slowly to the south and there is sufficient second-growth pine in that direction to maintain the beetle if biological factors continue to favor epidemic conditions. Stands in the path of the infestation are contiguous and lead to National Forest lands.

Table 1. STAND STRUCTURE ANALYSIS (TREES PER ACRE) IN TWO PREDOMINANTLY SECOND GROWTH PONDEROSA PINE STANDS FOLLOWING A MOUNTAIN PINE BEETLE OUTBREAK, CASCADE, IDAHO, 1971.

Warner Pond - North

Diam. Class (in.)	Ponderosa Pine				Lodgepole Pine				Total	
	Live		Dead		Live		Dead		All	
	Stems/ A	% of Stand	Stems/ A	% of Stand	Stems/ A	% of Stand	Stems/ A	% of Stand	Stems/ A	% of Stand
6	18.7	10.7	18.7	10.7	17.0	9.8	3.4	2.0	57.8	33.
8	9.0	5.2	30.0	17.2	8.0	4.6	4.0	2.3	51.0	29.
10	7.8	4.5	11.4	6.6	3.6	2.0	1.8	1.0	24.6	14.
12	10.4	6.0	4.8	2.8	2.4	1.4	1.2	.7	18.8	10.
14	9.6	5.5	2.4	1.4	.3	.2	-	-	12.3	7
16	2.6	1.5	.2	.1	.4	.2	-	-	3.2	1.
> 16	5.8	3.3	.2	.1	.4	.2	-	-	6.4	3.
	63.9		67.7		32.1		10.4		174.1	
		36.7		38.9		18.4		6.0		100.

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Warner Pond - South

Diam. Class (in.)	Ponderosa Pine				Lodgepole Pine				Total	
	Live		Dead		Live		Dead		All	
	Stems/ A	% of Stand	Stems/ A	% of Stand	Stems/ A	% of Stand	Stems/ A	% of Stand	Stems/ A	% of Stand
6	17.0	9.4	40.8	22.5	1.7	.9	1.7	.9	61.2	33.
8	11.0	6.0	49.0	27.0	2.0	1.1	5.0	2.7	67.0	36.
10	6.0	3.3	16.8	9.2	2.4	1.3	1.2	.7	26.4	14.
12	6.4	3.5	7.2	4.0	1.2	.7	-	-	14.8	8.
14	5.4	3.0	1.8	1.0	-	-	-	-	7.2	4.
16	1.4	.8	.6	.3	.2	.1	-	-	2.2	1.
> 16	2.6	1.4	.4	.2	-	-	-	-	3.0	1.
	49.8		116.6		7.5		7.9		181.8	
		27.4		64.2		4.1		4.3		100.

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	North	South
Coefficient of Variation (c.v.)	95.8%	66.3%
Sampling Error <sup>1/</sup> (E %)	30.7%	12.1%
Basal Area/Acre		
Live Ponderosa Pine	44.3	28.3
Dead Ponderosa Pine	27.3	43.3
Live Lodgepole Pine	11.7	3.7
Dead Lodgepole Pine	4.0	2.7
Total	87.3	78.00

<sup>1/</sup> One Standard Deviation



ENGRAVER BEETLES - Ips spp.

Ips activity has remained at a relatively low level for the past three years except for isolated outbreaks. A late report of Ips damage was investigated in November on the Cottonwood Ranger District involving two sales, Strawberry and the North Fork of Long Gulch.

The Strawberry sale consisted of 8 cutting units: 6 release and 2 regeneration. The slash plan called for logging and scattering, plus small amounts of jackpot piling along roads.

Logging started in June 1970 and terminated in August 1970. Approximately 5 MB bd. ft. of ponderosa pine was cut. Considerable slash was created and apparently Ips beetles built up in fairly heavy numbers in this material. It is assumed that successive generations emerged and continued to infest slash on the ground as no standing fader trees were found in 1970.

Thinning was started in and adjacent to the Strawberry sale units the first week of July 1971, and terminated the first week in August. Apparently a fairly high resident population of Ips was in the area as almost 100 percent of the downed thinned trees were attacked. Emerging adults then attacked small diameter standing trees and large groups of faders started showing in mid-September.

Usually late generation Ips do not cause much of a problem. However, weather factors favorable for Ips development were prevalent during July, August, and September. In those months weather patterns were characterized by low precipitation rates, low humidity, and high ambient air temperatures.

No logging or thinning is planned in this area for 1972. Ips populations usually cannot persist in standing trees and with no new slash or thinning debris anticipated, a decision was made to let the infestation run its course.

A similar problem exists in the North Fork of Long Gulch sale area. However, logging is anticipated here in 1972 and District personnel are concerned about sustaining the Ips problem when new slash will be put down.

One alternative that was discussed would be to tree length log - skid to central landings - buck, limb, and lop tops. This potential host material could be burned at night using proper safeguards.

Another alternative would be to negotiate with the contractor and adjust cutting schedules to a later date in the summer after the first and second generation flights have occurred. This should reduce considerably the chances of perpetuating Ips buildups.

WESTERN SPRUCE BUDWORM - *Choristoneura occidentalis* Free.

Last year budworm defoliation was the lowest recorded for eight consecutive years. The 1971 survey, however, revealed an almost threefold increase from 5,800 acres (1970) to 17,200 acres. Defoliation intensity also showed a rise. Following is a nine year resume' of budworm activity on the Forest:

Defoliation Class

<u>Year</u>	<u>Light</u>	<u>Moderate</u>	<u>Heavy</u>	<u>Total</u>
1963	2,400	10,081	43,680	56,160
1964	20,800	28,800	24,000	73,600
1965			60,200	60,200
1966	56,800	2,600	-	59,400
1967	25,100	3,800	-	28,900
1968	12,440	11,560	3,680	27,680
1969	21,500	8,000	1,500	31,000
1970	4,600	1,200	-	5,800
1971	12,400	4,800	-	17,200

Infestations up to 1969 had been confined to portions of the Idaho Primitive Area. This year two new defoliation centers were detected. One on Snowbank Mountain (West Mountain) and the other along the North Fork of the Payette River in the vicinity of Big Eddy. These areas of activity coincide with occurrences of new defoliation centers immediately northward on the Payette National Forest. At the present time tree damage is not serious enough to warrant consideration for control.

WESTERN TUSSOCK MOTH - *Orgyia vetusta* (Hy.Edw.)

Populations of this insect caused severe defoliation of *Connothus velutinus* in 41 widely scattered locations on the Cottonwood, Idaho City Ranger Districts, and Bureau of Land Management lands. The largest area of damage was approximately 1,400 acres on the Idaho City District.

After defoliating *Ceanothus* and other broad-leaved species, larvae migrated to young ponderosa pines where they consumed old growth needles. Only in rare instances were current year needles eaten.

Following is a table summarizing damage to ponderosa pines. The term "plot" refers to a single tree. Data were taken by arbitrarily selecting 10 single trees in a given area for examination and 100 percent counts made of egg masses. Defoliation of pines was visually estimated.<sup>1/</sup>

<u>Ponderosa Pine</u>				
<u>Trees</u>	<u>Ave. Height of Trees</u>	<u>Defoliation Class</u>	<u>Ave. No. New Egg Masses/Tree</u>	<u>Ave. No. Old Egg Masses/Tree</u>
1-10	6'6"	M	2.2	.7
11-20	4'2"	M	2.8	.5
21-30	6'2"	L	1.4	.8
31-40	5'2"	M	1.3	.7
41-50	6'9"	M	32.5	.5
<hr/>				
50 Tree Ave	5'8"	M	8.04	.6

The foregoing data represent egg mass deposition on ponderosa pines only. There is considerable variation between egg mass density on pines and *Ceanothus* which will be shown later. This variation can be readily explained. In areas where the tussock moth depletes *Ceanothus* and other broad-leaved species, larvae readily migrate to young pines. Here they continue to feed until pupation. Naturally they are "in place" on pines at this time so pupation, emergence, and egg laying can and does occur on the conifers.

This observation caused concern two years ago as observers thought initial feeding would take place on pines. This, however, does not happen as newly hatched larvae migrate immediately from conifers to their preferred broad-leaved host plants. Only when those plants are defoliated do larvae return to damage young pine trees.

<sup>1/</sup> 0-50% old growth needles destroyed	- Light
51-75% " " " "	- Moderate
76-100% " " " "	- Heavy

No specific evaluation system has been developed for sampling populations of western tussock moth in relation to predicting defoliation damage for the following year. In 1971, however, we adopted what might become a workable sampling method based on number of egg masses per individual branch of Ceanothus velutinus plants. These data will not give any meaningful information until another year (1972) of data are collected for comparative purposes. After sufficient information is gathered a workable sampling method should be established wherein reasonable damage predictions could be given land managers.

For the past few years this insect has built up rapidly, caused severe defoliation of Ceanothus and moderate damage to ponderosa pines then dropped off dramatically due to natural factors including a native polyhedrosis virus. Such was the case in 1970-1971. Currently, visual checks show very low egg mass deposition on Ceanothus which would indicate that defoliation will be light in 1972 with consequent low damage anticipated to young ponderosa pines.

#### PINE BUTTERFLY - *Neophasia menapia* (F.&F.)

The pine butterfly has been at relatively low levels of activity since 1954 when epidemic populations were reduced to tolerable levels by natural factors and use of aerial sprays.

Since 1969 an increase in this pest has been observed. During 1971 large flights of butterflies were reported from many areas of the Forest. Historically, this defoliator has caused severe damage and currently poses a potential threat to ponderosa pine stands.

To date defoliation has been light and we have been unable to detect damage during aerial surveys. Ground evaluations confirmed populations as being light.

Evaluations were based on work done earlier where two 15" branches are cut from five single trees spaced at five chain intervals. Pole pruners were used and sampling height was approximately 30 ft. In most cases, a minimum of two, five tree sample lines were run in each sampling area visited during 1971.

Defoliation intensity is classed as follows:

9 or more eggs/branch	- Heavy
5 - 8 " "	- Light
2 or less " "	- Endemic

Following is a table depicting results of the 1971 pine butterfly egg mass survey:

PINE BUTTERFLY EGG MASS SURVEY 1971 BOISE N.F.

Location and District			No. Trees Sampled	Recorded Masses Eggs		Ave. No. Eggs Per Branch
Harris Cr. Summit	<u>Idaho City</u>		20	2	25	1.25
Town Cr. (South Edge)	"	"	20	4	33	1.65
Bear Run Exp. For.	"	"	20	7	72	3.60
Alexander Gulch	"	"	20	1	9	.45
No. Fk. Rabbit Cr.	"	"	20	6	39	1.95
So. Fk. Thorn Cr.	"	"	10	1	6	.60
Rock Cr.	<u>Lowman</u>		10	2	35	3.50
Bear River	"		10	2	14	1.4
Little Beaver	"		10	1	13	1.3
Slaughterhouse Gulch	<u>Garden Valley</u>		10	1	17	1.7
Horn Cr.	"	"	10	1	4	.4
Scriber Cr.	"	"	10	5	49	4.90
Six Mi. Proj. Center	"	"	10	1	4	.4
Little Anderson Cr.	"	"	10	2	18	1.8

From the table it can be seen that three areas, Rock Cr., Lowman Ranger District, Bear Run, Idaho City Ranger District, and Scriber Cr., Garden Valley District, could experience moderate defoliation in 1972. Other areas are just starting to show light defoliation. If these trends continue, increased defoliation can be expected in 1972.



At present there are no pesticides registered for aerial application to control pine butterfly. Research has screened various candidate materials that show some promise. Any material that does show promise will have to be carefully field tested prior to operational use.